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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/605,420	09/30/2003	SHAO-YU TING	11247-US-PA	2419

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JIANQ CHYUN INTELLECTUAL PROPERTY OFFICE
7 FLOOR-1, NO. 100
ROOSEVELT ROAD, SECTION 2
TAIPEI, 100
TAIWAN

EXAMINER

ZHENG, LOIS L

ART UNIT	PAPER NUMBER
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1742

DATE MAILED: 10/19/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/605,420

Applicant(s)

TING ET AL.

Examiner

Lois Zheng

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 30 September 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: _____

DETAILED ACTION

Status of Claims

1. Claims 1-20 are currently under examination.

Drawings

2. The drawings are objected to under 37 CFR 1.83(a) because they fail to show
 - i. A bigger opening 204a as described on pages 8-9 of the specification,
 - ii. The opening 204b of the inner bath 204 as described on pages 11-12 of the specification, and
 - iii. The plating solution outlet 202b as described on pages 11-12 of the specification.

Any structural detail that is essential for a proper understanding of the disclosed invention should be shown in the drawing. MPEP § 608.02(d). Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each

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drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1-2, 6, 8-9, 13 and 16-17 are rejected under 35 U.S.C. 102(b) as being anticipated by Landau US 6,261,433 B1(Landau).

Landau teaches an electroplating apparatus comprising a workpiece having a plating area(Fig. 2 numeral 52) and electrical contact pins(Fig. 3 numeral 56) connected to a cathode member(Fig. 2 numeral 52) providing cathodic electrical connections to the workpiece, a container body(Fig. 2 numeral 42) with a workpiece holder(Fig. 2 numeral 44) under which the workpiece is placed, a mesh anode(Fig. 2 numeral 92) and a flow adjuster(Fig. 5 numeral 110) placed between the mesh anode and the workpiece.

Regarding instant claim 1, the container body, the workpiece holder, the cathode member and the flow adjuster of Landau read on the claimed bath, workpiece interface, cathode electrode and the flow-distribution device respectively. Landau further teaches that the flow adjuster can be a perforated(i.e. holes) plate and is used to enhance flow

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uniformity across the plating surface(col. 13 lines 33 – 59), which meets the structure limitations of the claimed flow-distribution device for the intended use of “providing an uniform distribution of a plating solution with even flow pressure over the workpiece”.

Regarding instant claim 8, the container body of Landau reads on the claimed inner bath. Landau further teaches an outer ring(Fig. 2 numeral 66) providing a space to hold overflow electrolyte from the inner container body. Therefore, the outer ring of Landau reads on the claimed outer bath.

Regarding instant claim 16, the container body of Landau has an open top wherein the flow adjuster directs the plating solution towards the workpiece. Therefore, the open top of the container body of Landau reads on the claimed first opening. Landau further teaches a plating solution supply device(Fig. 2 numeral 51) for pumping the plating solution to the inner bath via the second opening(Fig. 2 numeral 50), wherein the plating solution flows through the mesh anode and the flow adjuster(i.e. flow-distribution device) and then flow out of the outer ring(i.e. outer bath) via an outlet(Fig. 2 numeral 78) as claimed.

Regarding instant claims 2, 9 and 17, Landau further teaches that the flow adjuster is a ceramic or a polymer(col. 13 lines 36 – 40), which reads on the claimed insulating material.

Regarding instant claims 6 and 13, the electroplating apparatus of Landau comprises an inlet(Fig. 2 numeral 50) and an outlet(Fig. 2 numeral 78) as claimed. The limitations of how the plating solution flows through the mesh anode and the flow-distribution device providing a turbulent current and then flows out of the bath and

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wherein the plating solution is refreshed according are all process limitations, therefore, do not lend patentability to apparatus claims absent of factual evidence demonstrating the effect of the process limitation on the structure of claimed apparatus.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 3-5, 7, 10-12, 14 and 18-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Landau.

The teachings of Landau are discussed in paragraph 4 above. However, Landau does not explicit teach the claimed uniformly distributed or conical or cylindrical H-shape holes in the flow-distribution device, the claimed 0.1 – 500mm distance between the flow-distribution device and the workpiece, and claimed funnel-shaped bath.

Regarding instant claims 3-5, 10-12 and 18-19, Landau further teaches that the size and the spacings of the perforations(i.e. holes) in its flow adjuster(i.e. flow-distribution device) can be adjusted to produce the desired flow distribution(col. 13 lines 57-59). Therefore, it would have been obvious to one of ordinary skill in the art to have routinely adjust the size and spacings of the perforations of the flow adjuster of Landau to arrive at the claimed uniformly distribution, the claimed conical or claimed cylindrical H-shape holes in order to produce the desired flow distribution to the plating surface as taught by Landau. In addition, the shape of the holes in the flow-distribution device of

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Landau is a matter of choice which a person of ordinary skill in the art would have found obvious absent persuasive evidence that the particular hole configuration of the claimed container was significant. See MPEP 2144.04. In re Dailey, 357 F.2d 669, 149 USPQ 47 (CCPA 1966).

Regarding instant claims 7, 14 and 20, Landau further teaches the anode is positioned at a distance greater than 1 inch away from the substrate plating surface(col. 13 lines 6-13). Since the flow adjuster(i.e. flow-distribution device) of Landau is placed between the mesh anode and workpiece, the distance between the flow adjuster and the workpiece as inherently taught by Landau overlaps the claimed flow-distribution device to workpiece distance of 0.1 – 500mm. Therefore, a prima facie case of obviousness exists. See MPEP 2144.05. The selection of claimed flow-distribution device to workpiece distance from the disclosed flow adjuster to workpiece distance as taught by Landau would have been obvious to one of ordinary skill in the art since Landau teaches the same utilities in its flow adjuster to workpiece distance range.

7. Claims 1, 3-8, 10-16 and 18-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Woodruff et al. US Patent Application Publication 2003/0217916 A1(Woodruff) in view of Landau.

Woodruff teaches an electroplating apparatus comprising a workpiece(Fig. 2 numeral 209) having a plating surface(Fig. 2 numeral 230), a contact ring(Fig. 2 numeral 260) providing cathodic contact to the rim of the workpiece, an outer cup(Fig. 2 numeral 210) and an inner cup(Fig. 2 numeral 226) having an anode(Fig. 2 numeral 218) and a diffusion plate(Fig. 5 numeral 320) with fluid passages in the form of

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perforations(page 1 paragraph 0012). Woodruff further teaches an inlet(Fig. 2 numeral 216) for supplying the plating solution to the inner cup and outlet holes(Fig. 2 numeral 236) for draining the overflow plating solution out of the outer cup. The inner cup of Woodruff's apparatus has an open top(Fig. 2) wherein the diffuser plate directing the plating solution towards the workpiece plating surface and bottom openings for pumping the plating solution to the inner cup.

Regarding instant claims 1, 8 and 16, the contact ring, the outer cup, the inner cup, the perforated diffusion plate, the open top and the bottom openings of Woodruff's apparatus read on the claimed cathode electrode, outer bath, inner bath, flow-distribution device, the first opening and the second opening respectively. The claimed plating solution supply device as recited in instant claim 20 is inherently present in the electroplating apparatus of Woodruff in order to provide plating solution to the electroplating apparatus for it to be operational.

However, Woodruff does not explicitly teach that the anode is a mesh anode.

The teachings of Landau are discussed in paragraphs 4 and 6 above.

Therefore, it would have been obvious to one of ordinary skill in the art to have incorporated the mesh anode of Landau into the electroplating apparatus of Woodruff since Landau teaches that a mesh electrode provides a high surface area which minimize anode polarization and oxidative side reactions(col. 12 lines 57-66).

Regarding instant claims 3-5, 10-12 and 18-19, even though Woodruff in view of Landau do not explicit teach the claimed uniformly distributed or conical or cylindrical H-shape holes in the flow-distribution device, it would have been obvious to one of

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ordinary skill in the art to have routinely adjust the size and spacings of the perforation of the diffusion plate of Woodruff in view of Landau to arrive at the claimed uniformly distribution, the claimed conical or claimed cylindrical H-shape holes in order to produce the desired flow distribution to the plating surface as taught by Landau(col. 13 lines 57-59). In addition, the shape of the holes in the diffusion plate(i.e. flow-distribution device) of Woodruff in view of Landau is a matter of choice which a person of ordinary skill in the art would have found obvious absent persuasive evidence that the particular hole configuration of the claimed container was significant. See MPEP 2144.04. In re Dailey, 357 F.2d 669, 149 USPQ 47 (CCPA 1966).

Regarding instant claims 6 and 13, Woodruff in view of Landau teach the claimed inlet and at least an outlet. The limitations of how the plating solution flows through the mesh anode and the flow-distribution device providing a turbulent current and then flows out of the bath and wherein the plating solution is refreshed according are all process limitations, therefore, do not lend patentability to apparatus claims absent of factual evidence demonstrating the effect of the process limitation on the structure of claimed apparatus.

Regarding instant claims 7, 14 and 20, Landau further teaches the anode is positioned at a distance greater than 1 inch away from the substrate plating surface(col. 13-lines 6-13). Therefore, it would have been obvious to one of ordinary skill in the art to have incorporated the anode to workpiece distance of greater than 1 inch as taught by Landau into the electroplating apparatus of Woodruff in order to assure that the effects of level variation in the anode copper, particulate fluidization and assembly

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tolerances are negligible once the electrolyte flow reaches the substrate surface as taught by Landau(col. 13 lines 6 – 13). In addition, since the diffusion plate(i.e. flow-distribution device) of Woodruff in view of Landau is placed between the mesh anode and workpiece, the distance between the diffusion plate and the workpiece as inherently taught by Woodruff in view of Landau overlaps the claimed flow-distribution device to workpiece distance of 0.1 – 500mm. Therefore, a prima facie case of obviousness exists. See MPEP 2144.05. The selection of claimed flow-distribution device to workpiece distance from the disclosed diffusion plate to workpiece distance as taught by Woodruff in view of Landau would have been obvious to one of ordinary skill in the art since Woodruff in view of Landau teach the same utilities in their diffusion plate to workpiece distance range.

Regarding instant claim 15, the inner cup of Woodruff in view of Landau has funnel shape as claimed(Woodruff, Fig. 2). The bottom opening of the inner cup of Woodruff in view of Landau reads on the claimed first opening with the claimed inlet and the open top of the inner cup of Woodruff in view of Landau reads one the claimed bigger second opening with the claimed flow-distribution device.

8. Claims 2, 9 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Woodruff in view of Landau, and further in view of Simpson et al US 6,500,324 B1(Simpson).

The teachings of Woodruff are discussed in paragraph 7 above.

However, Landau does not explicitly teach that the diffuser plate(i.e. flow-distribution device) comprises an insulating material as claimed.

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The teachings of Landau are discussed in paragraphs 4 and 6 above.

Therefore, it would have been obvious to one of ordinary skill in the art to have incorporated a ceramic material used in the flow adjuster of Landau in making the diffuser plate of Woodruff since Simpson teaches that non-conductive diffuser reduces the likelihood of any current conduction or any adverse reactions with the plating solution(col. 3 lines 7-11).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lois Zheng whose telephone number is (571) 272-1248. The examiner can normally be reached on 8:30am - 5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy King can be reached on (571) 272-1244. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

LLZ

ROY KING
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